

ECLAT

European Cluster Assimilation Technology

BETWEEN SUN AND EARTH, A CLOSER LOOK AT THE MAGNETOSPHERE

Shielding Earth from the solar wind, the magnetosphere is believed to be paramount for Earth's climate. It is home to the best observed space plasma environment in the universe. The ECLAT project aims to provide data and develop new tools to further enhance our understanding of this critical space where Earth interacts with the forces of the Sun.

Earth's magnetosphere was discovered 1958 by the US Explorer 1 satellite. Baptised 1959 by Austrian astrophysicist Thomas Gold, it is "the region above the ionosphere in which the magnetic field of the earth has a dominant control over the motions of gas and fast charged particles".

Today, some 50 years later the magnetosphere is subject to intense attention from scientists throughout the world, who are exploring the environmental impact of the Sun-Earth connection. Now the best observed space plasma environment, the sheer volume of scientific data from the magnetosphere generates new challenges as scientists engage with in situ measurements, remote-sensing observations, and modelling on micro-, meso-, and global scales.

Yet given the variety of observational methods and measurement types, fully exploiting this incredible source of data is extremely difficult.

The ECLAT project takes on this challenge, as it intends to provide better tools for coordinated analysis. The project is set to facilitate scientists' aspirations to develop "reanalysis" and assimilation technology in order to marry model output with observations, hence providing a holistic, synoptic 3D time-history of the state of the magnetosphere.

In doing so, ECLAT intends to upgrade the already existing European Space Physics Data Centre and the ESA Cluster Active Archive (CAA), increasing their data holdings and developing new software tools that would facilitate data-mining and data visualization. Thereby ECLAT will provide a contextual framework for interpretation of all magnetospheric data-sets, with a significant positive impact on science in the area of plasma physics.



STEVE MILAN
IS PROJECT COORDINATOR

QUESTIONS & ANSWERS

What do you want to achieve with this project?

The Cluster spacecraft mission has generated an unparalleled dataset for space physicists. We want to improve its science return by providing supporting data from other observatories and developing tools to mine the data.

Why is this project important for Europe?

The Cluster mission was built and is operated by the European Space Agency, its instruments are predominantly European. It is important for Europe to maximise exploitation of its science investment, and ECLAT will do this.

How does your work benefit European citizens?

Cluster helps us understand the influence of the Sun on near-Earth space, the radiation hazard for satellites and other commercial interests, and ultimately our climate. ECLAT will further enhance this understanding.



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ECLAT will provide supporting data for the ESA Cluster Active Archive and develop a toolkit for the analysis of space plasma and solar terrestrial physics

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LIST OF PARTNERS

- University of Leicester, United Kingdom
- Oesterreichische Akademie der Wissenschaften, Austria
- Finnish Meteorological Institute, Finland
- St. Petersburg State University, Russia
- Institutet för rymdfysik, Sweden

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PROJECT INFORMATION

European Cluster Assimilation Technology (ECLAT)

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